Nitrogen & Co-Pollutant Research Roadmap: *Implementing the SAB Report…and beyond*

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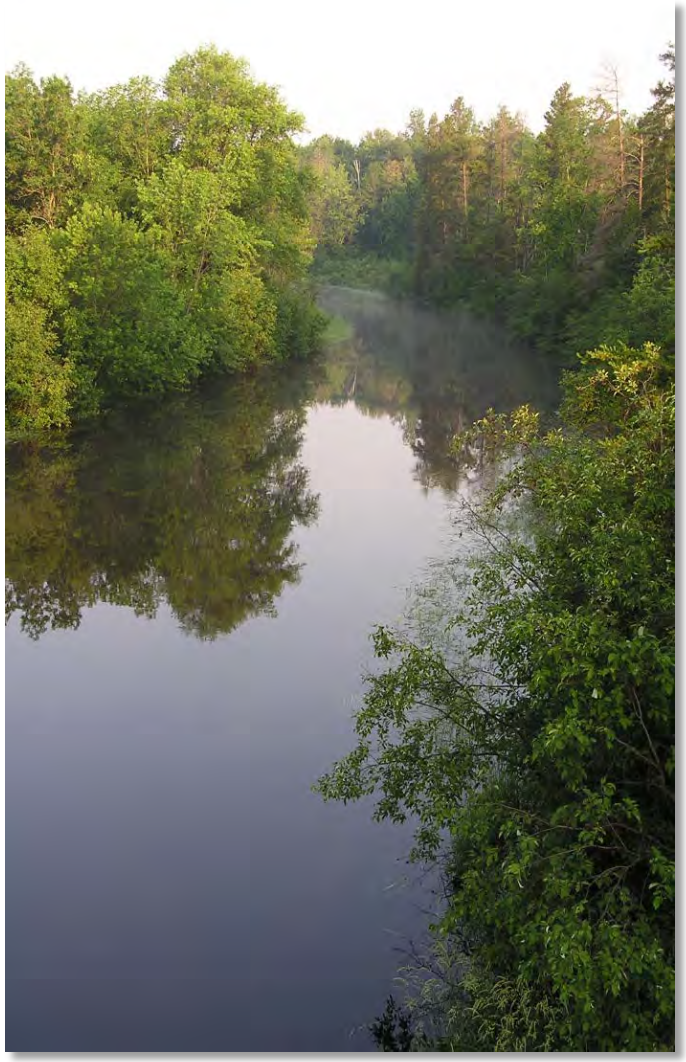
Anne W. Rea, Ph.D.
Office of Research & Development

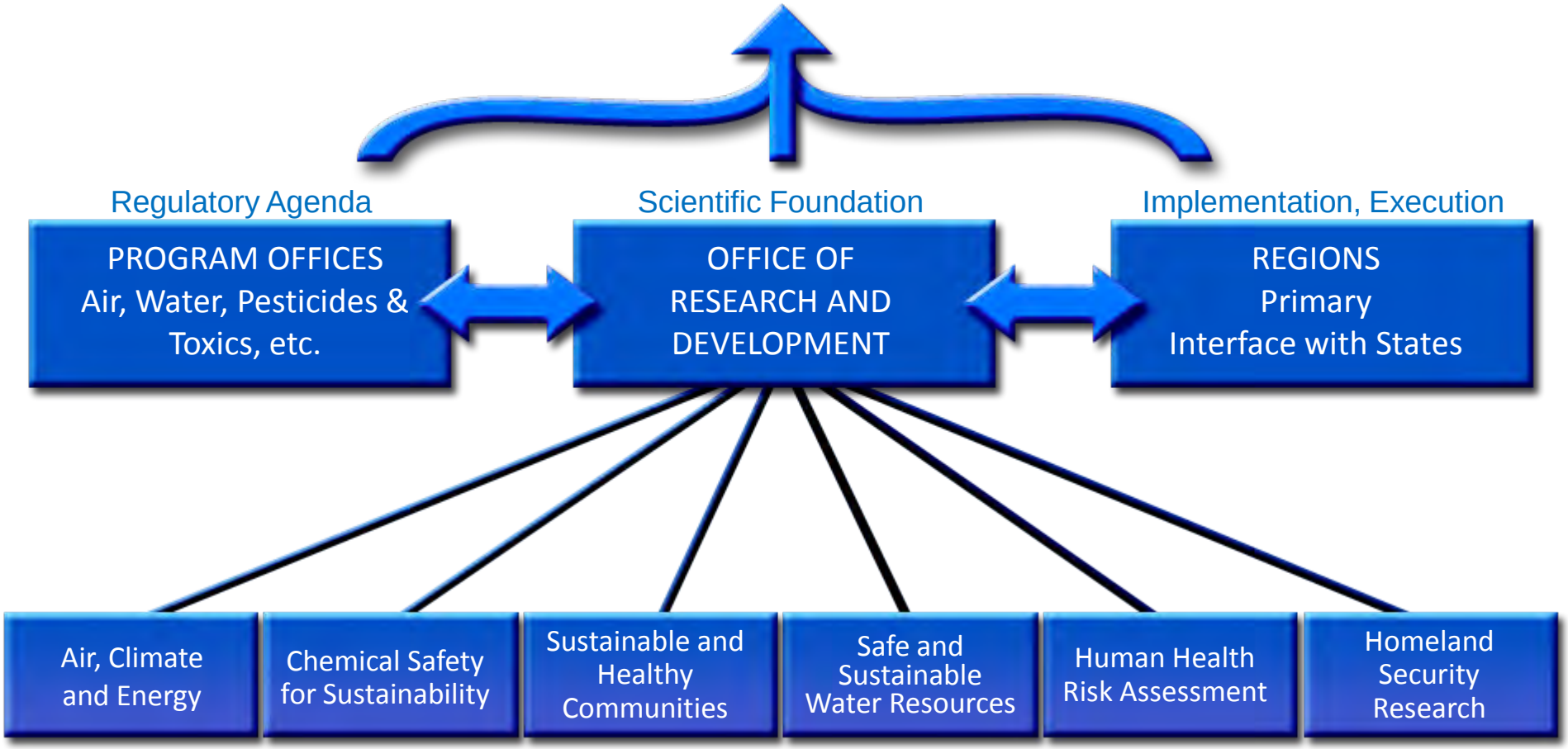
Purpose

- Background
- EPA's N Roadmap Effort
- Vision for Integration
- Implementation Plan
- Opportunities for Collaboration



EPA Mission

Protect human health and safeguard the natural environment – air, water, land – upon which life depends

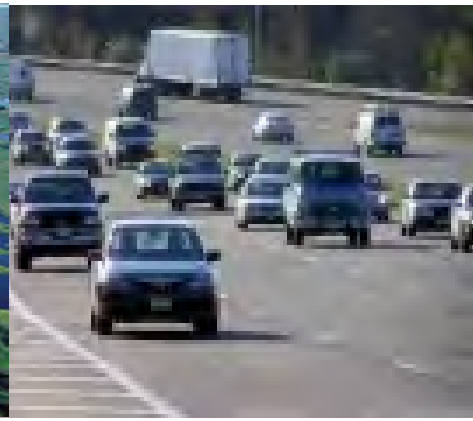


Nutrients are Mission Critical

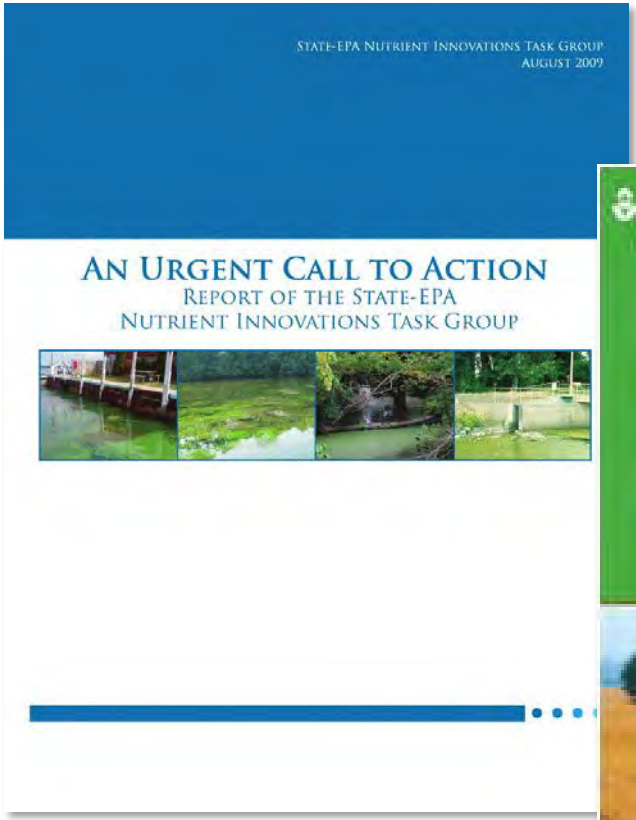
Poses many challenges to traditional pollution regulatory systems since effects cross traditional media-specific regulatory boundaries

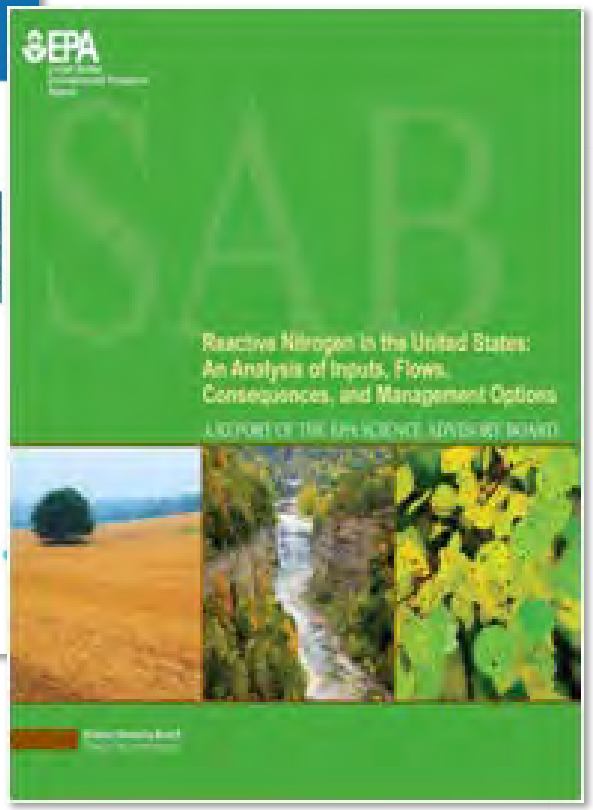
(CAA, CWA, SDWA)

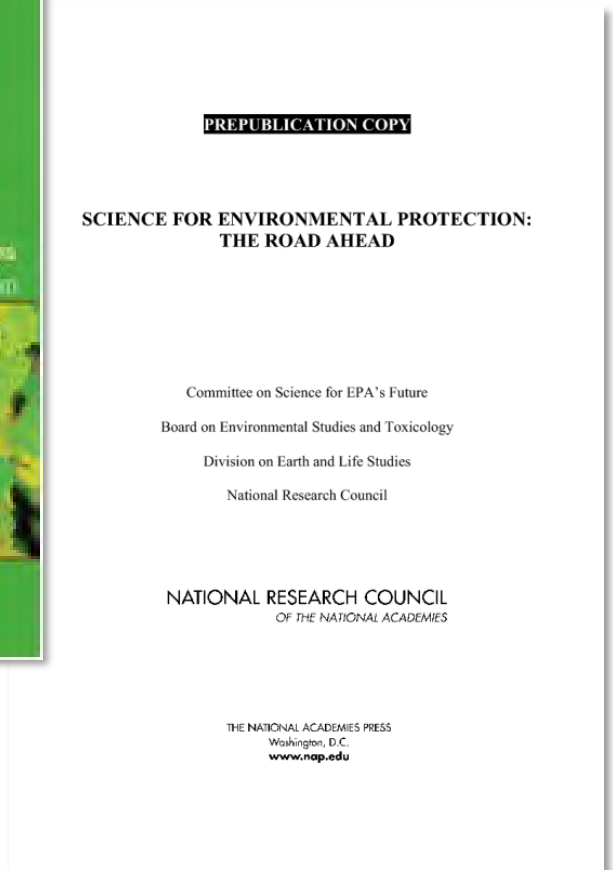


State EPA, SAB & NRC Support

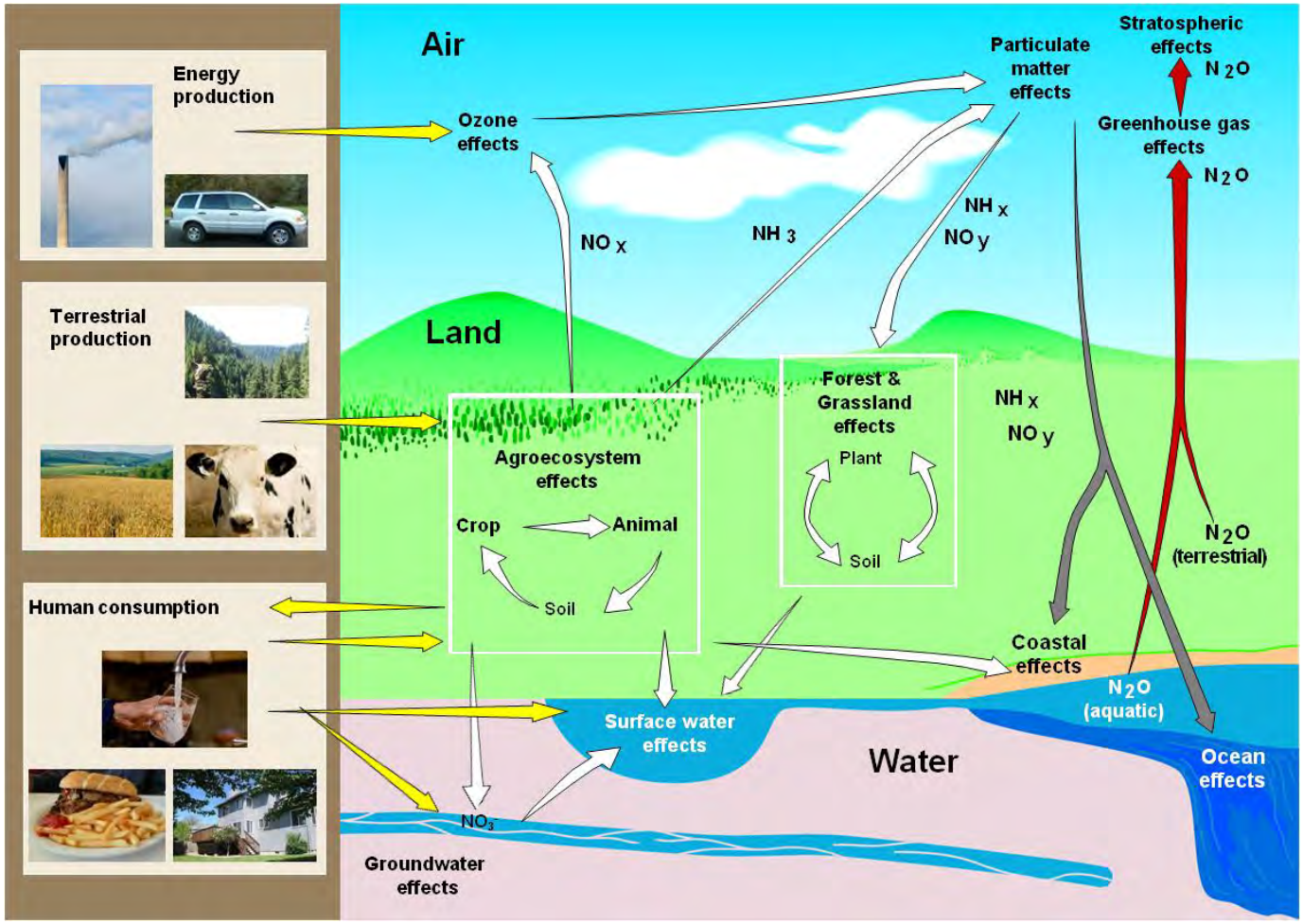






The Nitrogen Cascade

Community Level Decisions



modified from Galloway et al. 2003 and Compton et al. 2011

Policy Levers

OAR: NAAQS: PM, O_3, NO_X, SO_X; Title IV, mobile sources, Clean Air Interstate Rule

OW: Framework for State Nutrient Reduction, EPA Eco-Regional Water Quality Criteria, State narrative & numeric water quality criteria, National Pollution Discharge Elimination System permits, TMDLs, drinking water MCLs, Gulf Hypoxia Task Force, Nonpoint Source Control Program, State Revolving Loan Fund

What's in The Roadmap?

- Develops a common understanding of cross-cutting research
- Recognizes & commits to the importance of coordination
- Communication
- Underscores innovative approaches & sustainability

Value of The Roadmap

- Addresses SAB recommendations, EPA Program Office concerns, Regional needs
- Offers synthesis in a way that individual research programs & Program Office efforts simply cannot

Two-Part Roadmap

Vision for Integration:

- One-EPA perspective
- Research integration is key
- Sustainable approach that is economically feasible, socially acceptable, and protects environmental & public health
- Broad stakeholder engagement

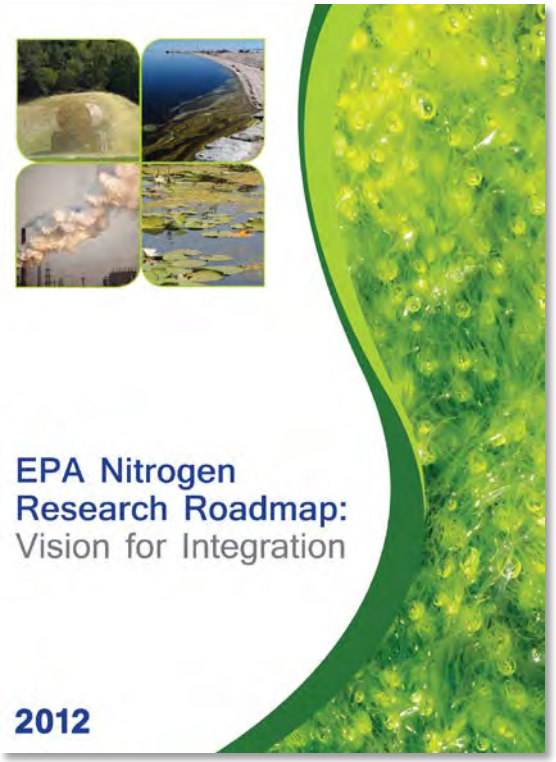
Implementation Plan:

- Underscores innovation & sustainability
- Synthesis
  - Inform decisions
  - Enables integration
  - Identifies research gaps
  - Adds value to ORD Research Programs, Program Offices & Regions

Vision for Integration

Significant reductions in N loadings are necessary to meet air & water quality goals

Key Question: What would be the most economically efficient, socially acceptable & environmentally sound ways to meet air & water quality goals?



Nitrogen Research Roadmap
A one-EPA perspective on sustainable nitrogen & co-pollutant management for research planning & management

- Optimizes the uses of nitrogen
- Reduces environmental & health impacts
- Maximizes the benefits to society

Implementation Plan

- Research Framework
- Path Forward
  - Outcomes
  - Outputs
  - Generalized critical paths
- Gap Analysis
- Future Directions
- Synthesis

It's More Than N Alone

Reactive nitrogen including consideration of co-pollutants, such as phosphorus, sulfur, carbon & sediments

Nitrogen & Co-pollutant Research Roadmap

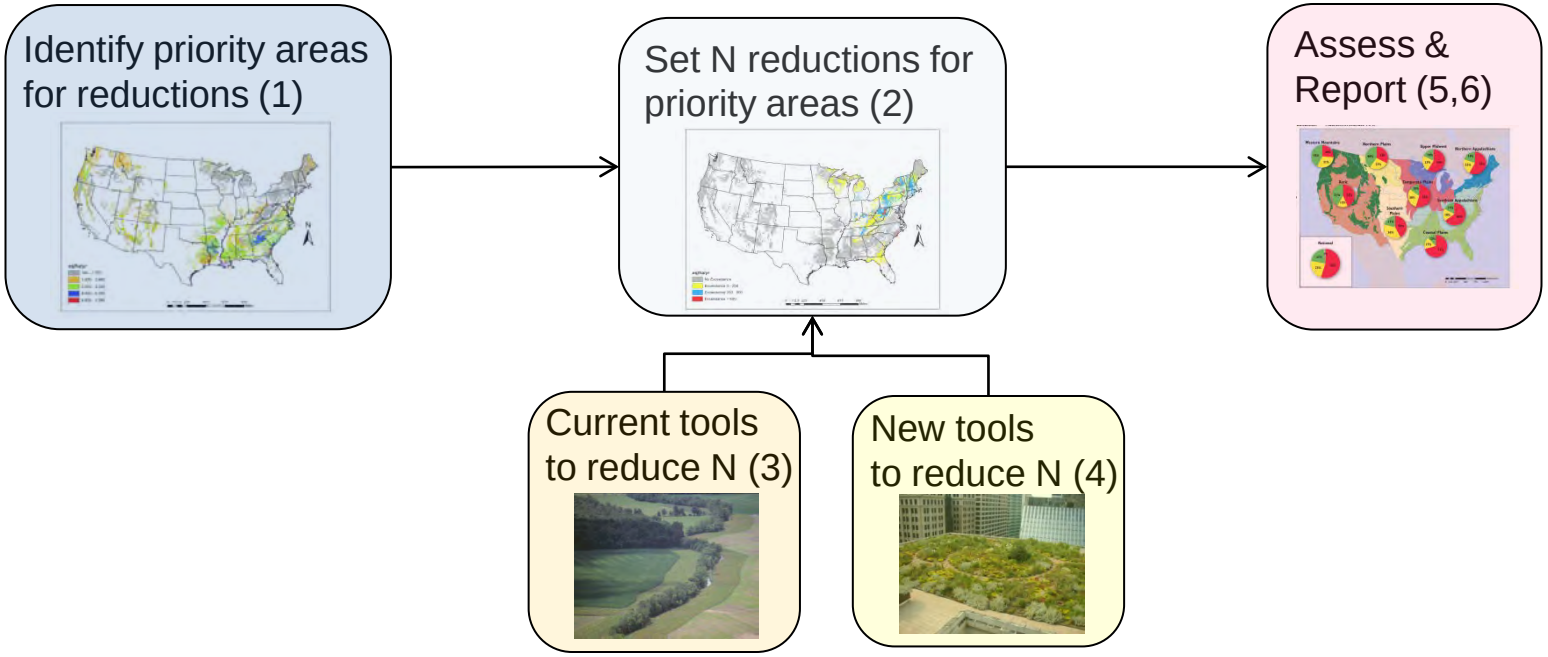
How Are We Going to Get There?

- Overarching Outcome & Output
- Research Elements
  - Sub-outcome
  - Sub-output
  - Generalized Critical Path
- Not necessarily sequential
- Many will occur in unison
- Avoids duplication of effort & redundancy

Framework

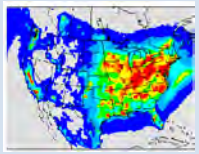
- Overarching Outcome
  - Reduced & avoided ecological & public health impacts from N pollution to air, water & land
- Overarching Output
  - Models, tools & technologies that incorporate scientific, social, economic & cross-media factors to inform regulatory & non-regulatory solutions to N pollution

Conceptual Model

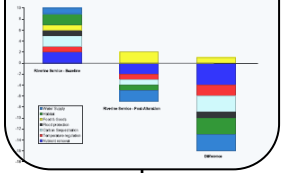


Conceptual Model

Estimate & predict N source & loads

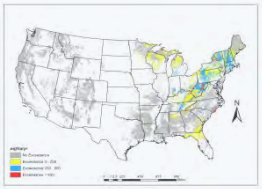


Economic & social analysis



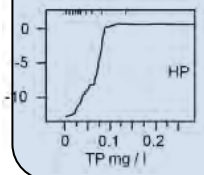
Identify priority areas for reductions (1)

Set N reductions for priority areas (2)



Assess & Report (5,6)

Develop Criteria



Current tools to reduce N (3)

New tools to reduce N (4)

System-based Knowledge

- Terrestrial
- Wetlands
- Freshwater
- Coastal

Place-based Knowledge

- Regions
- Chesapeake
- MRB
- Tampa Bay

Project Mapping

Cross-walk current research projects/tasks across ORD, OW, OAR & Regions

Sustainable & Healthy Communities

SAFE AND SUSTAINABLE WATER RESOURCES RESEARCH PROGRAM

AIR CLIMATE ENERGY

Office of Water

HHRA
Human Health Risk Assessment

Office of Air & Radiation

Project Attributes Cross-walk

- Media Focus (3)
- End Point System (5)
- Spatial Scale (3)
- Time Focus (2)
- Product Focus (20)
- Eco/Socio/Economic Focus (4)
- Specific Policy(ies)/Decision(s) Informed

Engaging Other Federal Partners

- USGCRP Biogeochemical Cycling N Workgroup
- Developing a Federal N Research Strategy
- USDA/EPA working meeting
- Nutrients Prize Challenges

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE

Opportunities for Collaboration

- Engage in Roadmap discussions
  - Potential gaps
  - Demonstration areas/projects
- Participate in any of the Federal efforts
  - Program Offices
  - Working meetings
  - State/Regional efforts

Let's Keep Talking

Anne Rea

Rea.anne@epa.gov

919-541-0053